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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/982,846

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Atsushi Koike

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04/01/2005

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EXAMINER

KIELIN, ERIK J

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 04/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Ex

Office Action Summary	Application No. 09/982,846	Applicant(s) KOIKE ET AL.	
	Examiner Erik Kielin	Art Unit 2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) 5-8 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12 January 2005 has been entered.

Response to Amendment

2. The amendment to the claims filed on 12 January 2005 does not comply with the requirements of 37 CFR 1.121(c) because the status of claims 5 and 6 have not been properly provided as "withdrawn -- currently amended." See especially the text in bold below. **Should Applicant fail to properly indicate the claim status again, the amendment will be held non-responsive and no action will accompany the notice of non-responsive amendment.**

Amendments to the claims filed on or after July 30, 2003 must comply with 37 CFR 1.121(c) which states:

(c) *Claims*. Amendments to a claim must be made by rewriting the entire claim with all changes (e.g., additions and deletions) as indicated in this subsection, except when the claim is being canceled. Each amendment document that includes a change to an existing claim, cancellation of an existing claim or addition of a new claim, must include a complete listing of all claims ever presented, including the text of all pending and withdrawn claims, in the application. The claim listing, including the text of the claims, in the amendment document will serve to replace all prior versions of the claims, in the application. In the claim listing, the status of every claim must be indicated after its claim number by using one of the following identifiers in a parenthetical expression: (Original), (Currently amended), (Canceled), (Withdrawn), (Previously presented), (New); and (Not entered).

(1) *Claim listing.* All of the claims presented in a claim listing shall be presented in ascending numerical order. Consecutive claims having the same status of “canceled” or “not entered” may be aggregated into one statement (e.g., Claims 1–5 (canceled)). The claim listing shall commence on a separate sheet of the amendment document and the sheet(s) that contain the text of any part of the claims shall not contain any other part of the amendment.

(2) *When claim text with markings is required.* All claims being currently amended in an amendment paper shall be presented in the claim listing, indicate a status of “currently amended,” and be submitted with markings to indicate the changes that have been made relative to the immediate prior version of the claims. The text of any added subject matter must be shown by underlining the added text. The text of any deleted matter must be shown by strike-through except that double brackets placed before and after the deleted characters may be used to show deletion of five or fewer consecutive characters. The text of any deleted subject matter must be shown by being placed within double brackets if strike-through cannot be easily perceived. Only claims having the status of “currently amended,” or “withdrawn” if also being amended, shall include markings. **If a withdrawn claim is currently amended, its status in the claim listing may be identified as “withdrawn—currently amended.”**

(3) *When claim text in clean version is required.* The text of all pending claims not being currently amended shall be presented in the claim listing in clean version, i.e., without any markings in the presentation of text. The presentation of a clean version of any claim having the status of “original,” “withdrawn” or “previously presented” will constitute an assertion that it has not been changed relative to the immediate prior version, except to omit markings that may have been present in the immediate prior version of the claims of the status of “withdrawn” or “previously presented.” Any claim added by amendment must be indicated with the status of “new” and presented in clean version, i.e., without any underlining.

(4) *When claim text shall not be presented; canceling a claim.*

(i) No claim text shall be presented for any claim in the claim listing with the status of “canceled” or “not entered.”

(ii) Cancellation of a claim shall be effected by an instruction to cancel a particular claim number. Identifying the status of a claim in the claim listing as “canceled” will constitute an instruction to cancel the claim.

(5) *Reinstatement of previously canceled claim.* A claim which was previously canceled may be reinstated only by adding the claim as a “new” claim with a new claim number.

Election/Restrictions

Applicant comments that claims 5-8, particularly claim 5 should be rejoined. The claims 5-8 are drawn to a distinct species and **will not be rejoined**. The location of the auxiliary electrode is completely different as it is not in the discharge space. This species **will not be**

examined in the present application. Should claims 1-4 be deemed allowable, claims 5-8 **must be canceled**.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 8-97161 (**Takai**) in view of US 4,795,529 (**Kawasaki et al.**).

Regarding claim 1, **Takai** discloses a film-forming method for forming a deposited film on a substrate **205, 305** arranged in a substantially enclosed film-forming vessel (Figs. 2, 3) by means of plasma CVD, said film-forming vessel being provided with a raw material gas introduction means **211, 302** and an exhaustion means **208, 308**, said film-forming method comprising the steps of

introducing a raw material gas comprising at least a hydrogen gas and a silicon-containing raw material gas into said film-forming vessel through said raw material gas introduction means (Tables 2, 4);

maintaining an inner pressure of said film-forming at a desired value by means of said exhaustion means (Tables 2, 4); and

introducing a high frequency power into said film-forming vessel through a discharge electrode **213, 313** provided in said film-forming vessel to generate a plasma in a plasma

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generation region **212, 312** between said substrate **205, 305** and said discharge electrode **213, 313** in said film-forming vessel, thereby forming said deposited film on said substrate maintained at a desired temperature using heater **207, 307**,

characterized in that the formation of said deposited film on said substrate is performed while repetitively applying a periodicity voltage having at least two different waveform components (20 to 450 MHz component and DC bias voltage component) having a different amplitude to an auxiliary electrode **202, 302** arranged at a position in said plasma generation region of said film-forming vessel. (See at least paragraph [0014].)

Takai does not indicate that the DC component is a periodic waveform component.

However, **Kawasaki** teaches a plasma deposition characterized in that the formation of said deposited film on said substrate is performed while repetitively applying a periodicity voltage having at least two different periodic waveform components --one of which is a periodic DC component (Fig. 3; col. 4, lines 11-31; col. 7, lines 6-20)-- having a different amplitude to an auxiliary electrode. (See Figs. 3, 8, 10, 12, and 17.) **Kawasaki** teaches that the two components give more control of the plasma and thereby improve the results of the plasma deposition (Abstract.)

It would have been obvious for one of ordinary skill in the art, at the time of the invention to apply the two waveform components of **Kawasaki** to the auxiliary electrode of **Takai** to give improved control of the plasma, in particular improved control of the acceleration of the ions toward the substrate. There exists a reasonable expectation of success since one of the two components applied to the electrodes in each of **Takai** in **Kawasaki** is for the same purpose of accelerating the ions toward the substrate.

Regarding claim 2, it is seen to be inherent that the periodicity voltage of **Takai** in view of **Kawasaki** has (i) a waveform component having an amplitude capable of generating mainly a radical of a silicon-containing compound and (ii) a waveform component having an amplitude capable of forming mainly a radical of hydrogen. (See Table 2.) Because the source of both hydrogen and silicon can be silane (SiH_4), the periodicity voltage components (i) and (ii) can be the same component. There exists no requirement that the components (i) and (ii) be different. Accordingly, the component that dissociates silane produces mainly a radical of silicon and mainly a radical of hydrogen by breaking one Si-H bond of silane.

Regarding claim 3, **Takai** discloses the auxiliary electrode **202, 302** is arranged such that said auxiliary electrode **202, 302** is opposed to a film-forming surface of the substrate **205, 305** and is situated at a position between the substrate **205, 305** and the discharge electrode **213, 313**. (See Figs. 2 and 3.)

Regarding claim 4, **Takai** discloses the auxiliary electrode **208** is arranged to be in parallel to the substrate **205, 305** and perpendicular to a flowing direction of the raw material gas which flows from the raw material introduction means **211, 302** toward the exhaustion means **208, 308** in the film-forming vessel. (See Figs. 2 and 3.)

Response to Arguments

5. Applicant's arguments filed 12 January 2005 have been fully considered but they are not persuasive.

Applicant argues that Kawasaki does not remedy the deficiencies of Takai because of the location of the electrode in Kawasaki relative to its location in Takai. Examiner respectfully

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disagrees, and particularly directs Applicant to his own statements on the record, as indicated in the instant specification, that the auxiliary electrode can be entirely outside the plasma generation region, as presently claimed in non-elected claims 5-8, and yet still serve the same purpose.

Accordingly, there is no merit to the argument that the respective location of the electrodes in Takai and Kawasaki are different since the electrode in each is for the same purpose and because Applicant admits on the record that the location of the auxiliary electrode does have to be in the plasma generation region to have this impact. Moreover, one of ordinary skill in the art knows well that the electrodes need not even be inside the chamber to affect the plasma.

For at least these reasons, the arguments are not found persuasive.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erik Kielin whose telephone number is 571-272-1693. The examiner can normally be reached from 9:00 - 19:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Erik Kielin
Primary Examiner
March 30, 2005